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# SERVICE MANUAL

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## PlumeSafe<sup>®</sup> *Whisper*<sup>™</sup> 602 Smoke Evacuation System

SM9600 \$5.00  
April 15, 1999

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## ***Mode of Operation***

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The PlumeSafe Whisper 602 Smoke Evacuation Filtration System is designed to remove smoke and noxious odors from the smoke plume generated while performing laser and electrosurgical procedures.

These evacuation systems are designed with high suction and high flow rate centrifugal action pumps. The ultra-quiet motor is used to draw the smoke plume from the surgical site through the vacuum tubing and into the ViroSafe® filter where the smoke plume is purified by a series of filters and carbon. A single disposable filter is used to simplify the installation and removal during filter changes. This filter is completely enclosed to further protect the healthcare personnel from potential contamination. The ViroSafe® filter contains four different filter stages within a single housing to decontaminate the smoke plume.

The ViroSafe® filter is used with the PlumeSafe Whisper 602 Smoke Evacuation System.

The first stage of filtration is a pre-filter whose function is to trap and remove gross particulate and casual fluid, while capturing some micro-organisms.

The second stage of filtration is a VLSI (Very Large-Scale Integrated) grade ULPA (Ultra Low Penetration Air) high-tech, patented<sup>1</sup> filter designed to capture particulate and micro-organisms down to 0.01µm at an efficiency of 99.99995%. Each ULPA filter is pre-tested and certified before use and is impregnated with a chemical agent.

The third stage of filtration uses virgin coal grade activated carbon for the removal and adsorption of odors and toxic gases produced by the burning of tissue. These harmful gases are a health hazard to those healthcare workers who breathe them. For this reason, the highest quality virgin coal grade activated carbon is used. This activated carbon preferentially removes toxic organic gases rather than water vapor.

The fourth stage of filtration is an expanded foam and filtration media, both of which are also impregnated with a chemical agent, used to trap activated carbon fines from migrating out of the filter.



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<sup>1</sup> U.S. Patent: #5,874,052

## **Section A.**

### ***Cleaning & Maintenance***

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The procedure for cleaning and maintenance of the PlumeSafe Whisper 602 is as follows:

1. Clean the entire surface of the system with an appropriate surface disinfectant after each procedure. (Please avoid abrasive cleaners)
2. Clean the filter housing with an appropriate surface disinfectant after each procedure. (Please avoid abrasive cleaners)
3. Replug filter after each use.
4. **Dispose** the vacuum hose and all 'single' use disposable parts after each procedure. Dispose of in the appropriate manner for your locale.
5. Change the ViroSafe® filter at the prescribed number of hours for the filter being used. Failure to change the filter will affect the performance of the system.

## Section B.

### **Regulations and Compliance**

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The operational information contained in this section is intended for the customer review of compliance issues. The information pertains to the use of Buffalo Filter products both domestically and internationally:

1. The PlumeSafe Whisper 602 complies with IEC601.1 electrical specifications in the following systems: **PlumeSafe Whisper 602 - 120V/60Hz, 100V/50Hz & 60Hz , 220V/50 Hz, 240V/50Hz**
2. The PlumeSafe Whisper 602 Smoke Evacuation System(s) has a classification under the UL2601-1, Clause 5.1 of : **CLASS 1 Equipment**
3. The PlumeSafe Whisper 602 Smoke Evacuation System(s) has an identification under the UL2601-1, Clause 5.2 according to the degree of protection against electric shock: **Type B Equipment**
4. The PlumeSafe Whisper 602 Smoke Evacuation System(s) has an identification under the UL2601-1, Clause 5.3 according to the degree of protection against harmful ingress of water: **Ordinary Equipment (enclosed equipment without protection against ingress of water)**
5. The PlumeSafe Whisper 602 Smoke Evacuation System(s) has a classification under the UL2601-1, Clause 5.4 according to the method of sterilization or disinfection recommended by BUFFALO FILTER: **Unplug System. Wipe system with a damp cloth containing mild surface disinfectant solution, or soapy water. Wipe dry with a clean cloth. Do not steam sterilize or autoclave.**
6. The PlumeSafe Whisper 602 Smoke Evacuation System(s) has a classification under the UL2601-1, Clause 5.5 according to the degree of safety of application in the presence of flammable anesthetic mixture with air or with oxygen or nitrous oxide: **Equipment not suitable for use in the presence of Flammable Anesthetic mixture with air or with oxygen or nitrous oxide.**
7. The PlumeSafe Whisper 602 Smoke Evacuation System has a classification under the UL2601-1, Clause 5.6 according to the mode of operation: **Continuous Operation**
8. The fuses used on the circuit board are to be serviced by an authorized Buffalo Filter technician as follows: **120V/60Hz, 100V/50 Hz & 60 Hz, 220V/50Hz and 240V/50Hz use a 0.0625A/250V fuse**
9. The PlumeSafe Whisper 602 Smoke Evacuation System and all filters and accessories are not intended for contact with patients.
10. The PlumeSafe Whisper 602 Smoke Evacuation System is in full compliance with the **Medical Devices Directive II, Council Directive 93/42/EEC of 14 June 1993**
11. The PlumeSafe Whisper 602 Smoke Evacuation System complies with **the City of Los Angeles Electrical Codes.**



## **Cautions and Warnings**



Please note that all Cautions and Warnings should be read and understood prior to any operation of this equipment. Only personnel who have been properly trained in its operation should operate the PlumeSafe Whisper 602 Smoke Evacuation System.

A "**Warning**" is a situation in which improper operation of the system could adversely affect the operator of the equipment or the patient.

A "**Caution**" is a situation in which the PlumeSafe Whisper 602 or other equipment could be damaged by improper operation.

### **WARNINGS:**

- The ViroSafe® filters are completely disposable. Please handle these disposable filters in accordance with your local codes or regulations. These filters may be disposed or incinerated whichever is appropriate for your locale.
- The ViroSafe® filter should be changed according to the instructions. The ViroSafe® filter, used with the PlumeSafe Whisper 602 system, should not be used for more than is prescribed in the filter instructions. Failure to change these filters may result in decreased filter efficiency and contamination of the electric motor, vacuum pump, and sound absorbing components within the system.
- If casual fluid is expected to be introduced into the ViroSafe® filter and/or the PlumeSafe Whisper 602 system, fluid collection devices must be installed with the vacuum hose assembly. Failure to install a fluid collection device could cause filter blockage and electrical damage.

### **CAUTIONS:**

- Using any other filters or accessories not manufactured by Buffalo Filter may cause damage to the system and will be cause for voiding the warranty.
- DO NOT block either the tubing or the filter. If either becomes clogged or occluded, or if the airflow through either is significantly restricted, the motor/blower could overheat and cause the system to fail. The failure may be only a blown circuit but could cause complete motor failure.
- When suctioning fluids into the fluid collection container with any system, it is recommended that a 1/4" or smaller wand or silicone/PVC tubing be used at the patient end. Using anything larger than 1/4" tubing may offer flow rates that are too high for suctioning fluids in and around the surgical area.
- Care must be exercised in the installation of all hoses, adapters and suction canisters. Failure to follow the procedures outlined in this manual may result in overheating of the motor and be cause for voiding the warranty. Wear protective equipment and use "Universal Precautions" when handling used equipment.

## **Section C.**

### ***Periodic Inspection***

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The PlumeSafe Whisper 602 Smoke Evacuation System is engineered to provide the end user with many years of trouble free service. In order to maintain the system in top operating order the system should be inspected according to the following schedule:

#### **AFTER EACH USE:**

1. **Check filter life indicator, anticipate filter replacement.**
2. The system should be inspected for signs of physical damage and fluid or solid contamination after each use.
3. The filter should be inspected for physical damage, fluid or solid contamination, and filter life after each use. Please replace the filter if filter life has been expended.

#### **ONCE A WEEK:**

1. Check the "Service" light on the membrane keypad. If the light is lit, contact Buffalo Filter for service instructions.
2. Check the filter for physical damage, fluid or solid contamination, and filter life. If filter life has been expended, please replace the filter.
3. Examine the entire system for physical damage. Contact your local distributor or Buffalo Filter for service instructions if damaged.

#### **YEARLY INSPECTIONS:**

1. Check the "Service" light on the membrane keypad. If the light is lit, contact Buffalo Filter for service instructions.

<b><u>Special Note:</u></b>	<b>Use "Universal Precautions" procedure whenever handling contaminated filters or smoke evacuation equipment.</b>
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## **Section D.**

### ***Calibration & Adjustments***

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The PlumeSafe Whisper 602 Smoke Evacuation System is completely adjusted at the time of manufacture so that no additional adjustment to the system is necessary.

There is no need to calibrate any part of the PlumeSafe Whisper 602 Smoke Evacuation System, all calibration is performed at the factory.

If the "Service" light is illuminated at any time, contact your local distributor or Buffalo Filter for service instructions.

## Section E.

### Troubleshooting

Problem	Potential Cause	Corrective Action
1. Smoke Evacuation System is operational but suction is minimal or none.	<ol style="list-style-type: none"> <li>1. Filter not seated completely</li> <li>2. Filter clogged</li> <li>3. Vacuum hose clogged</li> <li>4. Motor/Blower obstructed</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-install ViroSafe® filter, press firmly into place and inspect for obstructions</li> <li>2. Replace ViroSafe® filter</li> <li>3. Check or replace hose</li> <li>4. Contact your local distributor or Buffalo Filter</li> </ol>
1. Smoke Evacuator System does not function even though "ON" button is pressed.	<ol style="list-style-type: none"> <li>1. Not plugged into electrical outlet or system not powered up with switch</li> <li>2. Circuit breaker(s) tripped</li> <li>3. Footswitch/Remote Switch plugged in</li> <li>4. Electronic system failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check power outlet or check to be sure system is powered up with switch on side</li> <li>2. Reset circuit breaker(s) on back of system</li> <li>3. Unplug footswitch or remote switch</li> <li>4. Contact your local distributor or Buffalo Filter</li> </ol>
2. "Service" light is lit.	<ol style="list-style-type: none"> <li>1. Motor/Blower needs servicing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact your local distributor or Buffalo Filter</li> </ol>
3. Motor/Blower operated intermittently.	<ol style="list-style-type: none"> <li>1. Incorrect power to system</li> <li>2. Electronic system failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the wall socket to be sure the correct power is supplied to system.</li> <li>2. Contact your local distributor or Buffalo Filter</li> </ol>

## **Section F.**

### **System Operation & Instructions**

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Operation of the PlumeSafe Whisper 602 Smoke Evacuation Filtration System is as follows:

1. Remove the Smoke Evacuator from the packaging and inspect for any damage that may have occurred during shipment. If any damage is present, please notify carrier immediately for damage assessment.
2. Inspect the filter section of the system to insure that no packing debris has fallen into the filter chamber. Remove any debris.
3. Install a ViroSafe® filter per the directions enclosed in the filter box.
4. Connect any adapters, hoses, tubing, electrosurgical pencils, etc. to complete the installation.
5. Electrically connect the system into a grounded 120V/60Hz electrical outlet. (If international, use appropriate voltage/frequency and a grounded connection.)
6. Press the ON/OFF rocker switch on the side of the system to the ON position.
7. Press the ON/OFF button on the membrane key panel to activate the motor.
8. Press the suction control UP ARROW button to 100%, then press the vacuum adjust DOWN ARROW button to 20%. Repeat to assure smooth operation.
9. Press the UP or DOWN ARROW buttons on the suction adjust again, both up or down, to verify the smooth operation of the motor speed from high to low speed and back again.

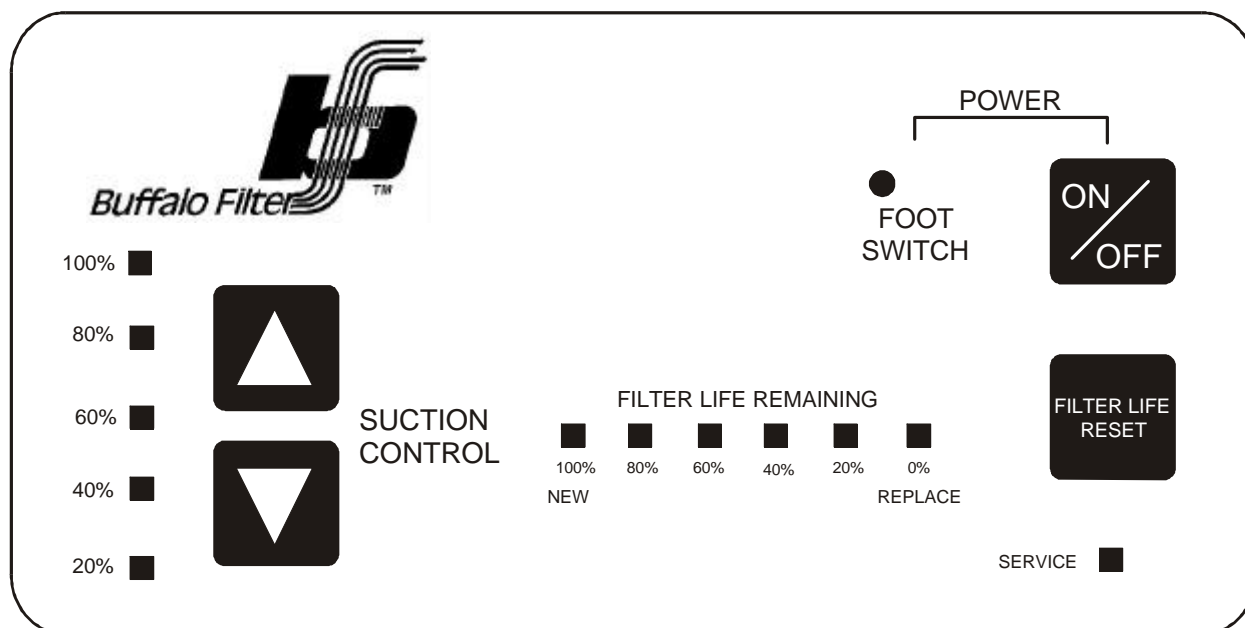
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**WARNING:** If casual fluid is expected to be introduced into the ViroSafe® Filter or PlumeSafe Whisper 602 system, fluid collection devices must be installed with the vacuum hose assembly. Failure to install a fluid collection device could cause filter blockage and electrical damage.


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## Electronic System Controls



Electronic system controls on the PlumeSafe Whisper 602 products are easy to understand and simple to use. The membrane control panel on the front of the smoke evacuation filtration system is identical for domestic and international systems. The membrane control panel is used to control the power, motor speed and the filter life indicator.

**Note:**  **Please make certain to read these instructions before installing or operating this equipment. Failure to do so could result in improper usage, damage to the system, and/or personal injury.**

The following are descriptions of the membrane panel controls for the PlumeSafe Whisper 602 system:

- **POWER**

There are two ON/OFF switches on each system. The ON/OFF switch that disables the electrical power to the system is located on the side of the system. The ON/OFF switch for the electronic membrane control panel is located on the front of the systems.

To turn the system electrical power on, press the rocker switch on the side of the system to the ON position. To turn the system electrical power OFF press the rocker switch to the OFF position.

To turn the system motor ON, press the ON/OFF button on the membrane panel until the motor is running. To turn the system motor OFF, press the ON/OFF button again.

- **SUCTION CONTROL**

The SUCTION CONTROL for air suction is adjusted by way of the internal speed microprocessor controller. The control UP ARROW button can be pressed to increase the air suction and DOWN ARROW button can be pressed to decrease the air suction. Control of the air suction can be done at any time with or without the motor running. Setting the air suction control at the lowest setting that still removes the smoke plume will lower the system noise. Each time either arrow is pressed the air suction will increase or decrease by 10%. When two lights are lit on the flow control panel the actual airflow is the percentage between the two lit numbers.

- **FOOTSWITCH/REMOTE SWITCH**

A footswitch or remote switch can be added to the system by simply plugging in a Buffalo Filter footswitch (P/N FS10003) or a Buffalo Filter Remote Switch Activator (P/N RSA1002) into the electrical jack on the side of the system.

When the footswitch is plugged in, the system may be turned on or off by pressing the footswitch pedal once for each operation. When not using the footswitch, please unplug and store away. For footswitch operation the power switch needs to be in the ON position. When the footswitch is plugged in, the light on the membrane control panel entitled FOOTSWITCH/REMOTE SWITCH will light to let the operator know the footswitch or remote switch is active.

When using the remote switch activator, please refer to the instruction sheet that accompanies that product.

- **CIRCUIT BREAKER**

Two (2) 15 AMP for domestic or two (2) 8 AMP for international circuit breakers are installed as standard on each system to electrically protect both the system and the operator from damage or injury. If the system is overheated or if there is an electrical surge in the system the circuit breaker(s) will "trip" and the system will not operate. In order to re-start the system press the circuit breaker button into its original position.

**Note:** On any Buffalo Filter smoke evacuator, there are two circuit breakers for the "hot" and "common" wires. Both circuit breakers act in the same manner. If either circuit breaker is tripped, press the circuit breaker button back into its original position.

- **FILTER LIFE REMAINING INDICATOR**

The filter life indicator on the membrane control panel allows the operator to know the status of the life of the filter being used. The filter life indicator for the PlumeSafe Whisper 602 system is factory set for 6 hours. These settings correspond to the actual filter life of the ViroSafe® filter for any system. After any filter is changed, the RESET button must be fully reset for the next filter. Pressing, and holding down the reset button for 5 seconds, can accomplish this. If the reset button is accidentally pressed at any time, the filter life indicator will not reset unless the button is held down for 5 seconds.

➤ **PlumeSafe Whisper 602:**

The filter life indicator button labeled 'RESET HOLD' must be pressed and held for 5 seconds for the filter life indicator to fully reset. Install a ViroSafe® filter into the PlumeSafe Whisper 602 system per the installation instruction contained in this operator's manual. When the PlumeSafe Whisper 602 system is turned on, the filter life indicator will light up all the GREEN, AMBER and RED LEDs indicating that there is still adequate life in the filter. When the filter has been used for 4 hours, the AMBER and RED lights will be illuminated to indicate that the ViroSafe® filter is nearing the end of its useful life. After 6 full hours have elapsed, the RED light will start blinking to indicate that the filter has expended its useful life and needs to be changed. At this time the ViroSafe® filter should be changed according to the removal instructions included in the operator's manual included with your PlumeSafe Whisper 602.

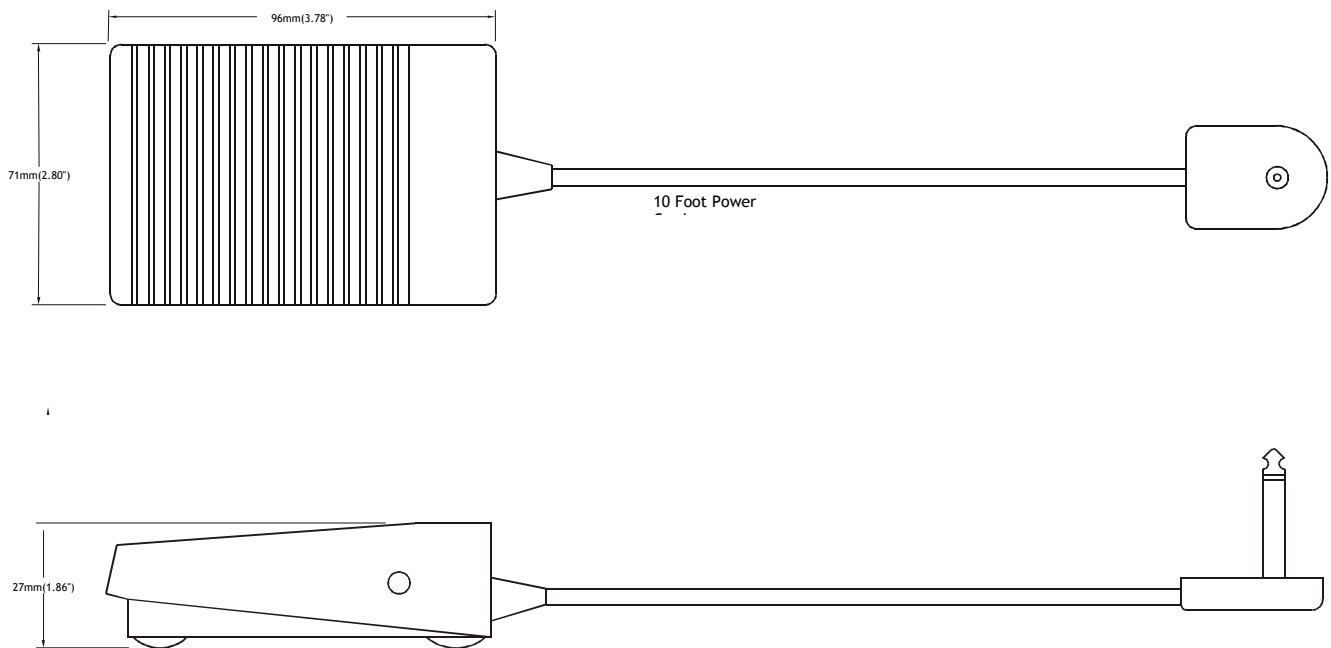
• **SERVICE LIGHT INDICATOR**

The RED service light indicator on the front membrane panel will illuminate after 500 hours of operation. When this occurs, all non-essential membrane panel functions except the on/off switch and the motor speed control for continuing the system operation will become non-operational until servicing can be completed.

**WHEN THE SERVICE LIGHT COMES ON, PLEASE CONTACT YOUR LOCAL DISTRIBUTOR OR BUFFALO FILTER FOR SERVICE INSTRUCTIONS ON THE SYSTEM.**

## **Footswitch Installation/Operation**

### **Footswitch**



1. Remove the Footswitch from the packaging and inspect for any damage that may have occurred during shipping.
2. Turn system off before installing Footswitch.
3. Connect the plug to the outlet on the system labeled "Footswitch". The PlumeSafe Whisper 602 system has a Footswitch inlet jack on the side of the system.
4. Turn the system ON to activate the Footswitch. The footswitch pedal will automatically become active once the plug is inserted into the footswitch socket on the system, and the light on the membrane control panel will become illuminated.
5. Press the footswitch pedal once to activate the system.
6. Press the UP or DOWN ARROWS of the vacuum adjust to the desired air suction.
7. Press the footswitch again to deactivate the system.

If the footswitch is not in use, remove the footswitch and store away until needed again.

## **Remote Switch Activator Installation/Operation**



The Buffalo Filter Remote Switch Activator (RSA1002) is designed for use with any brand of Electrosurgical Generator (ESU) that incorporates a Buffalo Filter Smoke Evacuation System. The RSA1002 operates essentially in the same manner as a footswitch; the smoke evacuator is turned on and off by pressing the "CUT" or "COAG" button on the ESU pencil.

The RSA1002 uses a patent pending<sup>2</sup> technology to sense the harmonic vibrations emitted by all electrosurgical generator units. These vibrations are recognized by the RSA1002, and will activate the smoke evacuator when the vibrations are present. Other operating room noises, tones, vibrations, beeps and personal loud noises should not activate the RSA1002.

### **Instruction Overview**

1. Remove RSA1002 from the package, check for damage.
2. Clean area on ESU with alcohol (**apply caution when using flammable liquids**) before installing RSA1002. Remove adhesive backing and place on ESU according to ESU "diagram" for your particular ESU generator.
3. Turn on Smoke Evacuation and adjust suction control to 50%, turn on ESU and adjust speaker volume to 50%.
4. Plug in the RSA1002 into jack labeled "Footswitch" or "Remote Switch" on the smoke evacuator.
5. Adjust the RSA1002 for both "CUT" & "COAG"; see Adjustment Instructions that come with the remote switch activator.
6. Operate the smoke evacuator remotely with the ESU hand control pencil by pressing either "CUT" or "COAG" button.

**Refer to the instructions that accompany the Remote Switch Activator for additional installation instructions and detailed placement of the Remote Switch.**

If the Remote Switch Activator is not in use, remove the Remote Switch Activator and store away until needed again.

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<sup>2</sup> U.S. Patent Pending: #08/909,902



## **SYSTEM OPERATION**

1. Please follow the instructions for the proper and safe installation of the filter system before proceeding with the operation of the system. The installation of the disposable ViroSafe® filter is described in the Operators Manual that accompanied the product.
2. Once the system is properly installed and operating according to the above instructions, the operator may choose to increase or decrease the amount of suction. Pressing the UP or DOWN ARROW buttons on the membrane keypad will selection of a higher or lower setting. The 20% setting is the lowest suction strength and the 100% setting is the highest suction strength. Any setting in between can be used in order to remove smoke, fumes and toxic gases from the surgical site. Each pressing of either arrow increases or decreases the suction setting by 10%.

**Note: For the most efficient use of the virgin coal grade activated carbon, please use the lowest vacuum setting possible. This vacuum setting should be the lowest setting that clears the surgical field of smoke plume.**

3. At any time during the operation of the smoke evacuator, the vacuum can be adjusted to the desired setting. After setting the suction adjust to the highest setting, if you are still not clearing the field, this is an indication to change the disposable ViroSafe® filter.
4. When the filter life indicator **FLASHES RED**, this is an indication that the ViroSafe® filter has reached the end of its useful life and **needs to be changed**. Please refer to the instructions in the operator's manual provided with your Porta PlumeSafe Whisper 602 to properly change the filter.

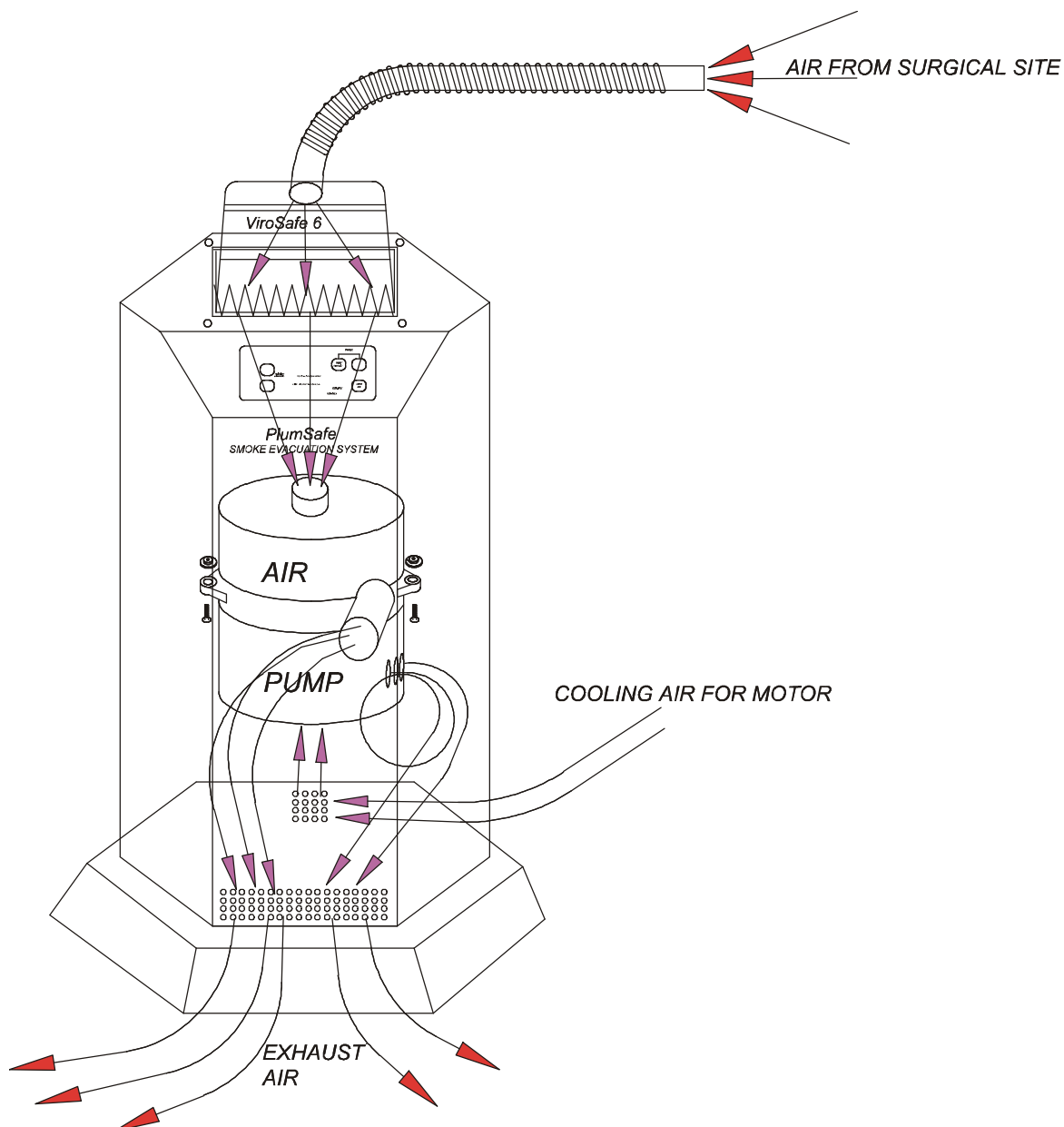
If any problems occur during in-service, please refer to Section E - Troubleshooting.

## Section G.

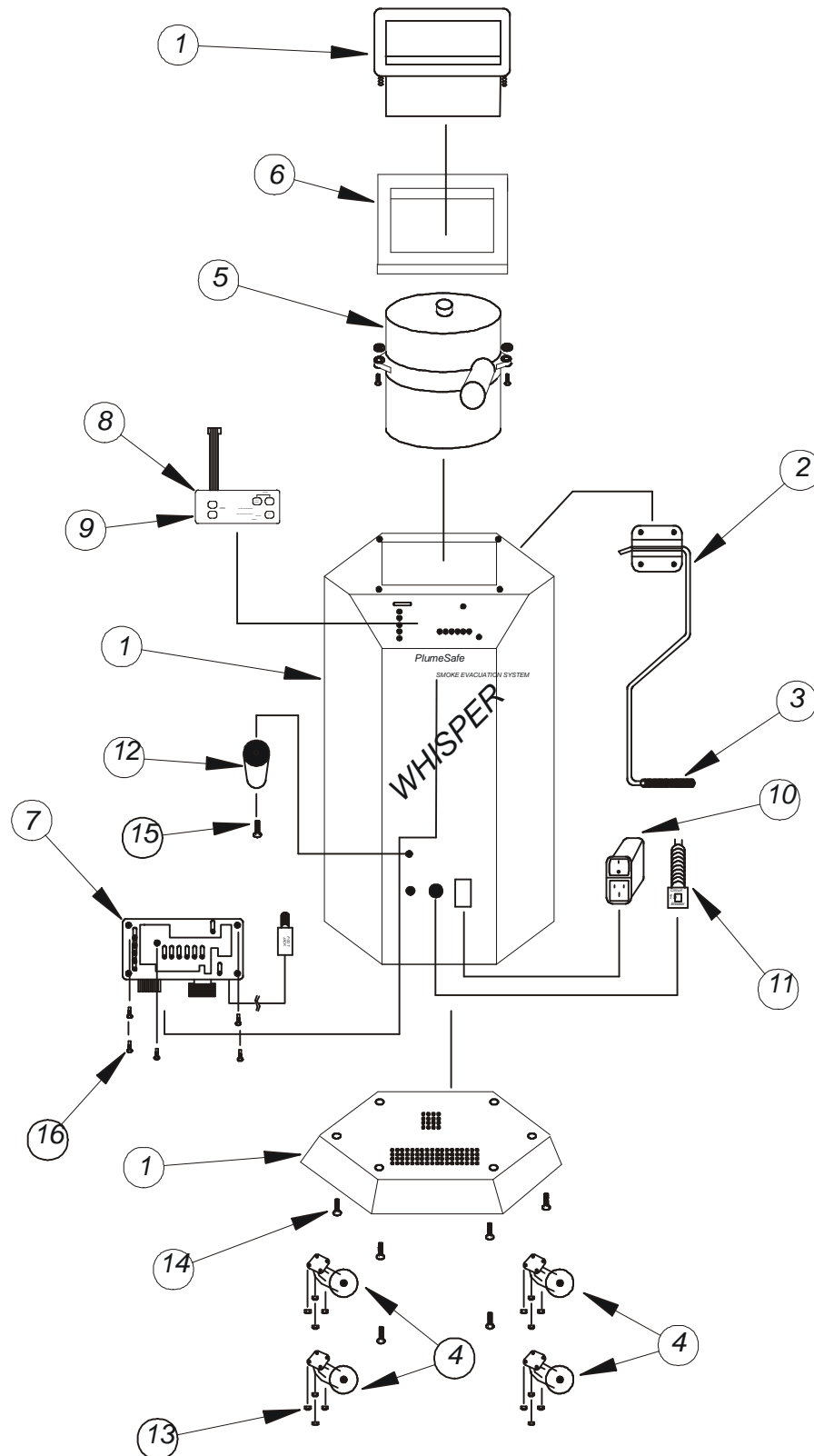
### System Diagram

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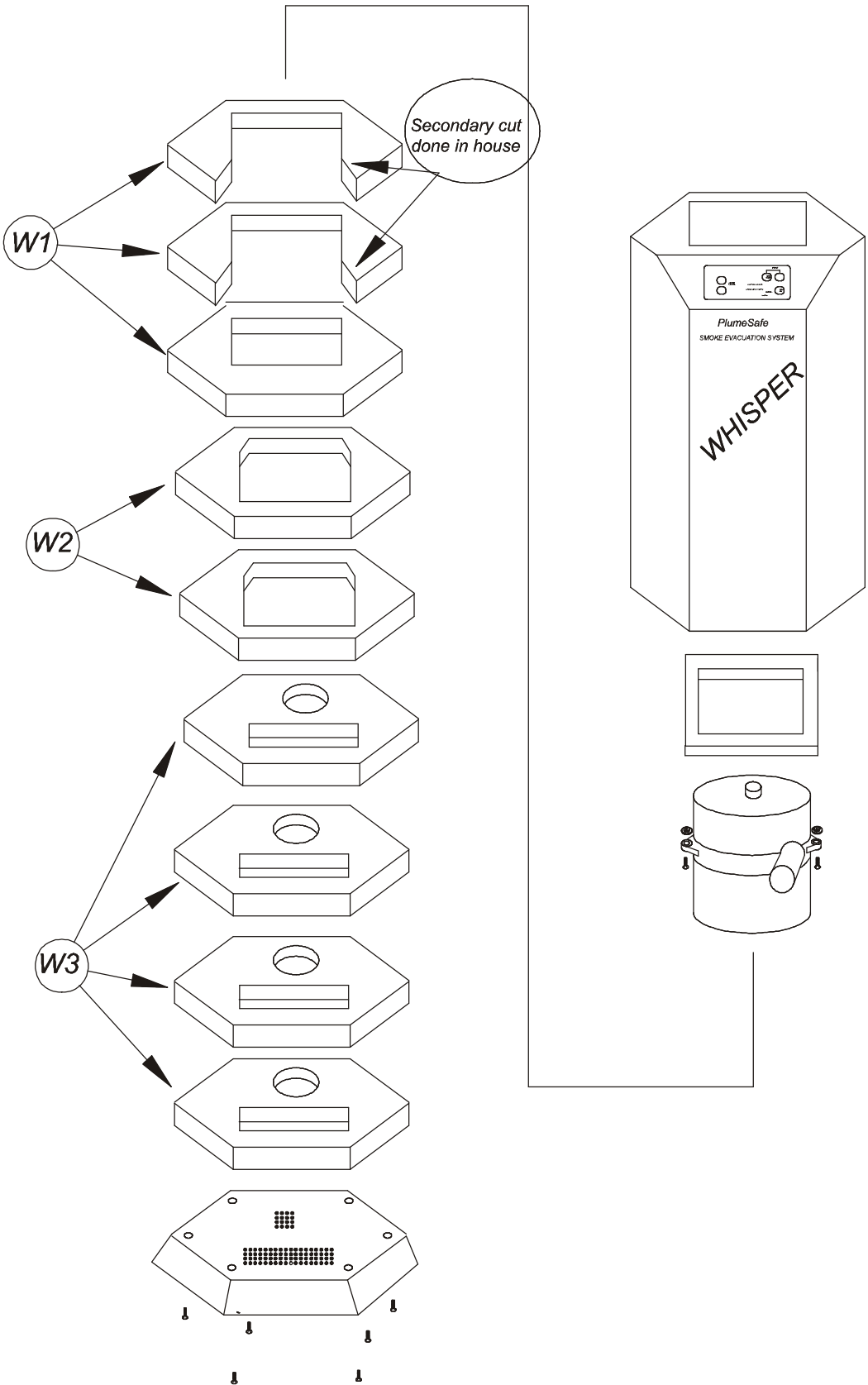
#### Airflow through the PlumeSafe Whisper 602



## **PlumeSafe Whisper 602 Explosion View**

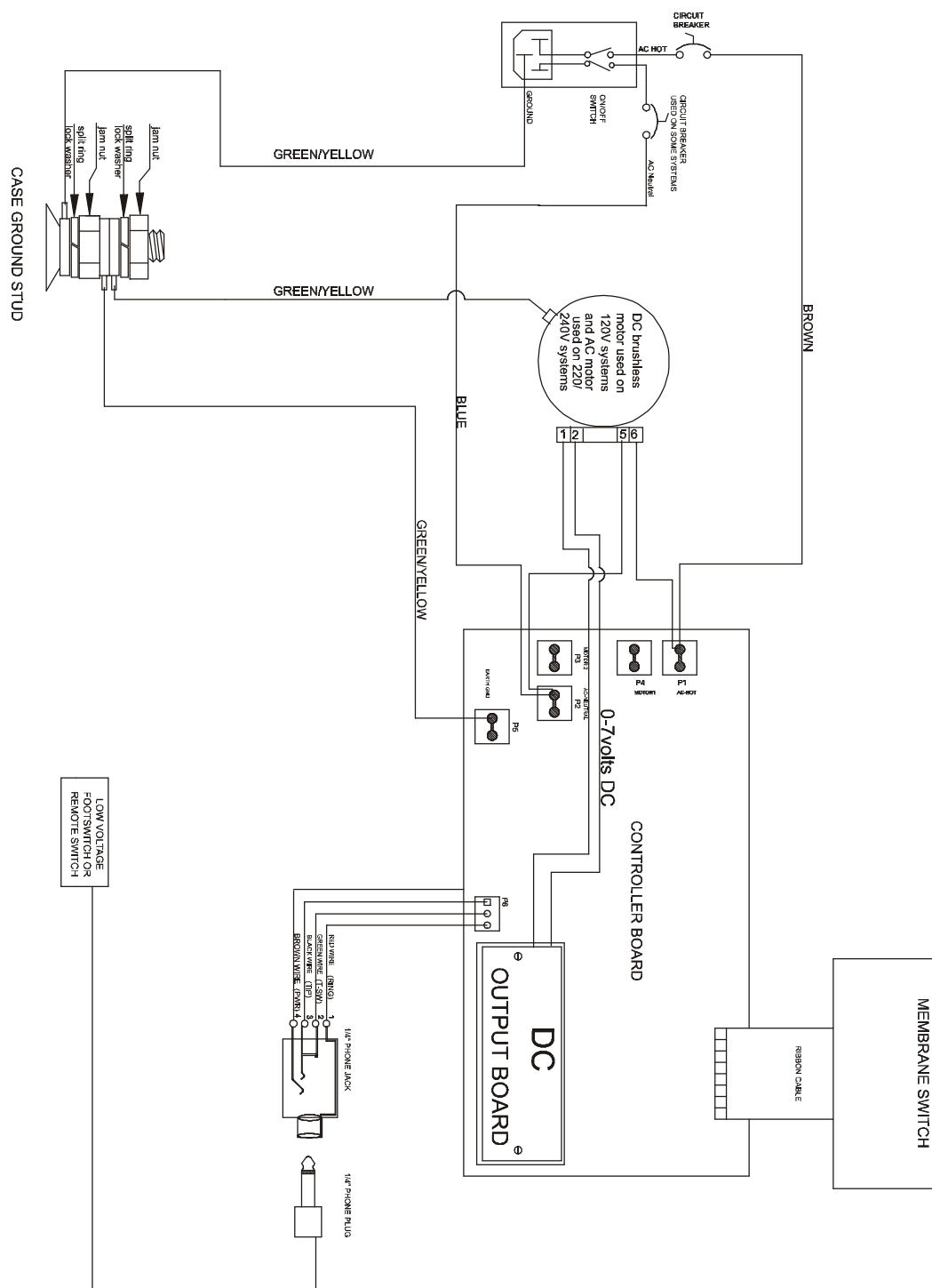


**PlumeSafe Whisper 602 Shell Insulation**



## Section H.

## Electrical Schematics



**NOTE:** Before performing any work on the PlumeSafe Whisper 602 make certain the system is turned off and the electrical plug has been disconnected from the wall power outlet.

**WARNING:** If fluid is expected to be introduced into the ViroSafe® Filter and/or the PlumeSafe Whisper 602 system, fluid collection devices must be installed with the vacuum hose assembly. Failure to install a fluid collection device could cause filter blockage and electrical damage.

**CAUTION:** Using any other filter or accessory not manufactured by Buffalo Filter may cause damage to the system and will be cause for voiding the warranty.

## Section I.

### ***Disassembly/Assembly Instructions***

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#### **WARNING: ELECTRICAL SHOCK HAZARD!**



Before performing any work on the PlumeSafe Whisper 602 make certain the system is turned off and the electrical plug has been disconnected from the wall power outlet.

Please refer to the PlumeSafe Whisper 602 System diagram in the previous section for details.

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#### **DISASSEMBLY INSTRUCTIONS**

In order to field service the Buffalo Filter PlumeSafe Whisper 602 Smoke Evacuation System, the system will need to be disassembled. Read the instructions below before attempting to service the system.

The disassembly of the PlumeSafe Whisper 602 Smoke Evacuation System is as follows:

1. Turn the system upside down as to expose the base where the four (4) wheels are mounted.
2. Spaced equally around the inside perimeter of the hexagonal base are six (6) button head fasteners. Using a 1/8" Allen Wrench remove all six (6) and the base will separate from the rest of the system.  
NOTE: Some earlier systems had six (6) button head fasteners around the outside perimeter of the shell which will require a 5/32" Allen Wrench.
3. Remove the acoustical insulation from the shell and stack each piece on top of each other keeping the orientation of each piece the same as inside the system.  
NOTE: When reinstalling the insulation it is very important to reinstall in the same way it was removed. Remember that the insulation not only dampens noise but also has openings that aid in two critical airflow pathways, cool air in and hot air out. Refer to the explosion view of the insulation for additional help in reinstalling the insulation.
4. When removing the insulation, some connecting wires to the power entry module on the back of the system will have to be removed first.
5. The circuit breaker can be removed by first removing the two (2) wires from the back of the circuit breaker. The removal of the circuit breaker can be accomplished by pressing the tabs on either side of the breaker and pushing the breaker to the outside of the shell.  
Note: The international systems require the removal of two (2) circuit breakers.
6. To remove the power entry module, press the small tabs on the back of the component and remove from the back of the system.
7. Disconnect all electrical motor leads and using a 1/8" Allen Wrench remove the bolts holding the motor to the filter basket assembly.
8. Carefully remove the motor from its mount. Next remove the motor mount gasket.  
NOTE: The direction of the exhaust airport is critical because during reinstallation it must

point toward the front of the system. The front of the system is where the controller board is mounted.

9. Using a 3/8" socket with a long extension remove the four (4) nuts that hold the filter basket in place.
10. Remove the filter basket from the top of the system.
11. Remove the Footswitch/Remote Switch inlet jack by removing the nut on the outside of the shell with a 1/2" wrench turning counterclockwise. Note: Do not attempt to disconnect the footswitch wiring from printed circuit board (PCB), as the entire footswitch jack assembly will be removed with the PCB.
12. For this step, you will need to be electrically grounded. Remove the 5 bolts, type 6-32, from the circuit board using a #2 Phillips screwdriver or a flat screwdriver for some earlier production models. Carefully remove the circuit board and place in an anti-static holder.  
**NOTE: You must be grounded before servicing any part of the controller board or removing it from the shell. Failure to be grounded when removing the PCB could cause permanent electrical damage.**
13. If the microprocessor needs to be replaced on the controller board you must be grounded prior to servicing the controller board. Locate the microprocessor on the controller board. If necessary, using a chip puller, remove the microprocessor from the circuit board.  
**NOTE: No other components should be removed from the circuit board other than the microprocessor.**
14. If necessary the fuse can be replaced on the controller board by using a fuse puller to remove the 0.0625 amp fuse from the circuit board. (This is only applicable on newer models where the circuit board has quick disconnect fuse clips. This is not applicable to older models where the fuse is soldered to the board).  
**NOTE: No other components should be removed from the circuit board other than the fuse.**
15. If necessary on all international systems, remove the RFI filter by unscrewing the two (2) Phillips head fasteners and removing the wires connections.
16. If any of the wheels need to be serviced they can be easily removed as follows: Using a 3/8" nut driver or open end wrench, remove the four (4) nuts from the base of the wheel.
17. Note: Refer to the explosion view of all the components in this Service Manual to correctly guide you through all of the disassembly/assembly steps.

## **REASSEMBLY INSTRUCTIONS**

**For reassembly of the PlumeSafe Whisper 602 Smoke Evacuation System, please follow the above instructions in reverse order.**

Note: Refer to the Electrical Schematic in Section H for the correct wire terminations during assembly.



**Section J.****Systems Specifications**

<b>Specifications</b>	<b>PlumeSafe Whisper 602</b>	<b>PlumeSafe Whisper 602/220</b>	<b>PlumeSafe Whisper 602/240</b>	<b>PlumeSafe Whisper 602/100</b>
<b>Buffalo Filter Part Number</b>	<b>PSW0602</b>	<b>PSW0602/220</b>	<b>PSW0602/240</b>	<b>PSW0602/100</b>
Flow Rate MAX. - CFM (LPM)	1 1/4" = 40(1133) 7/8" = 33(935) Buffalo Filter ESU Pencil = 4.4(125)	1 1/4" = 59(1671) 7/8" = 42(1189) Buffalo Filter ESU Pencil = 5(142)	1 1/4" = 60(1699) 7/8" = 43(1217) Buffalo Filter ESU Pencil = 5(142)	1 1/4" = 40(1133) 7/8" = 33(935) Buffalo Filter ESU Pencil = 4.4(125)
Motor Rating-CFM (LPM)	110 (3115)	111 (3144)	111 (3144)	110 (3115)
Motor Stages	3	2	2	3
Static Suction, inches H <sub>2</sub> O (mbar)	75" H <sub>2</sub> O (187)	95.2" H <sub>2</sub> O (231)	95.2" H <sub>2</sub> O (231)	75" H <sub>2</sub> O (187)
Electrical Power:				
AMPS	5.4	8.0	8.0	5.4
Volts	120	220	240	100
Frequency (Hz)	50 & 60	50 & 60	50 & 60	50 & 60
Dimensions:				
Height (cm)	20" (50.8)	20" (50.8)	20" (50.8)	20" (50.8)
Width (cm)	14" (35.6)	14" (35.6)	14" (35.6)	14" (35.6)
Length (cm)	14" (35.6)	14" (35.6)	14" (35.6)	14" (35.6)
Weight, lbs. (kg)	28.5 (13.0)	28.5 (13.0)	28.5 (13.0)	28.5 (13.0)
Filter	ViroSafe®	ViroSafe®	ViroSafe®	ViroSafe®
Filtration Efficiency	99.99995%	99.99995%	99.99995%	99.99995%
Filtration Rating	0.01µm	0.01µm	0.01µm	0.01µm

## **Section K.**

### **Ordering Parts**

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Please order all parts, accessories and replacement filters for the PlumeSafe Whisper 602 by contacting your local distributor or Buffalo Filter directly at:

1-800-343-2324 (US only)

**Or**

716-835-7000

(If calling internationally, use International Dialing Codes)

FAX: 716-835-3414

E-mail: **info@buffalofilter.com**

Web Site: **http://www.buffalofilter.com**

**Section L.****Replacement Parts List**

**PlumeSafe Whisper 602**  
**120V / 50 & 60Hz**

#	Quantity	Part Number	Description
1	1	HOUSING 602W	Whisper 602 Housing
2	1	MOTOR 120 DC	DC Brushless Motor
3	1	GSKT MM WSP	Gasket for Motor, SC-42 Closed Cell
4	1	HANDLEWHISPR	Handle For Whisper 602
5	1	HANDLE FOAM	Foam for Whisper 602 handle
6	1	CORD WRAP	Cord Wrap for Whisper 602
7	2	CIRCUIT 15	US – 15Amp Circuit Breaker
8	1	PWR EN MD.08	Power Entry Module (.080")
9	1	PCB-DB26 ASY	Whisper 602 PCB w/26" jack
10	1	CHP W6	Chip W6
11	1	PLUG/CORD602	Plug/Cord 12' AEC60, AEC250
12	1	WIRE ASSBLY	Wire Assembly for Whisper 602 – Complete w/E-Terms
13	2	GASKET LED	LED Gasket
14	1	LBL WHIS S/N	Label Kit for Whisper 602
15	1	LBL CITY LA	Label for City of LA Approval
16	1	BOX WHISPER	Box for Whisper 602 System
17	1	KEYPADBFGRFX	Buffalo Filter Membrane Switch Graphics
18	1	MEMBRANEBLNK	Membrane Blank
19	5	BOLT10-32 .5	Bolt 10-32 0.5" SS
20	1	BOLT10-32.75	Bolt 10-32 0.75" Long
21	6	BOLT6-32 .5"	Bolt 6-32 0.5" Long -PAN HD
22	5	WASHER #6S	Star washer #6 electrical
23	2	WASHER 1/4"L	Lock Washer 1/4" split ring
24	4	WASHER #10F	Flat washer #10
25	2	NUT JAM10-32	Jam Nut 10-32, Zinc
26	24	NUT 10-32	10-32 Lock Nuts S/S
27	1	WALL PLATE	Wall Plate Suction Canister
28	4	WHEELS 2"	Whisper 602 Wheels
29	1	RUBBER FEET	Cylindrical Isolator
30	1	INSULKIT WSP	Insulation Kit for Whisper 602
31	8	ISOLATORS	Motor Isolators
32	1	MANUAL602/12	602/1202/Whisper/TURBO Operator's Manual

## PlumeSafe Whisper 602 220V / 50 & 60Hz

#	Quantity	Part Number	Description
1	1	HOUSING 602W	Whisper 602 Housing
2	1	MOTOR 220/240	Motor 220/240V International
3	1	GSKT MM WSP	Gasket for Motor, SC-42 Closed Cell
4	1	HANDLEWHISPR	Handle For Whisper 602
5	1	HANDLE FOAM	Foam for Whisper 602 handle
6	1	CORD WRAP	Cord Wrap for Whisper 602
7	2	CIRCUIT 8	Euro – 8Amp Circuit Breaker
8	1	PWR EN MD.08	Power Entry Module (.080")
9	1	PCB-AC26 ASY	Whisper 602 PCB w/26" jack
10	1	CHPW220/50/6	Chip W220/50/6
11	1	PLUG/CORD602	Plug/Cord 12' AEC60, AEC250
12	1	WIRE ASSBLY	Wire Assembly for Whisper 602 – Complete w/E-Terms
13	2	GASKET LED	LED Gasket
14	1	LBL WSP KIT	Label Kit for Whisper 602
15	1	LBL CITY LA	Label for City of LA Approval
16	1	BOX WHISPER	Box for Whisper 602 System
17	1	KEYPADBFGRFX	Buffalo Filter Membrane Switch Graphics
18	1	MEMBRANEBLNK	Membrane Blank
19	8	BOLT10-32 .5	Bolt 10-32 0.5" SS
20	1	BOLT10-32.75	Bolt 10-32 0.75" Long
21	5	BOLT6-32 .5"	Bolt 6-32 0.5" Long -PAN HD
22	5	WASHER #6S	Star washer #6 electrical
23	2	WASHER 1/4"L	Lock Washer 1/4" split ring
24	4	WASHER #10F	Flat washer #10
25	2	NUT JAM10-32	Jam Nut 10-32, Zinc
26	26	NUT 10-32	10-32 Lock Nuts S/S
27	1	WALL PLATE	Wall Plate Suction Canister
28	4	WHEELS 2"	Whisper 602 Wheels
29	1	RUBBER FEET	Cylindrical Isolator
30	1	INSULKIT WSP	Insulation Kit for Whisper 602
31	8	ISOLATORS	Motor Isolators
32	1	MANUAL602/12	602/1202/Whisper/TURBO Operator's Manual
33	1	REF6EHT1	PN#6EHT1
34	1	LBL CE SMALL	CE Label Small

## PlumeSafe Whisper 602 240V / 50 & 60Hz

#	Quantity	Part Number	Description
1	1	HOUSING 602W	Whisper 602 Housing
2	1	MOTOR 220/240	Motor 220/240V International
3	1	GSKT MM WSP	Gasket for Motor, SC-42 Closed Cell
4	1	HANDLEWHISPR	Handle For Whisper 602
5	1	HANDLE FOAM	Foam for Whisper 602 handle
6	1	CORD WRAP	Cord Wrap for Whisper 602
7	2	CIRCUIT 8	Euro – 8Amp Circuit Breaker
8	1	PWR EN MD.08	Power Entry Module (.080")
9	1	PCB-AC26 ASY	Whisper 602 PCB w/26" jack
10	1	CHP W240/50/6	Chip W240/50/6
11	1	PLUG/CORD602	Plug/Cord 12' AEC60, AEC250
12	1	WIRE ASSBLY	Wire Assembly for Whisper 602 – Complete w/E-Terms
13	2	GASKET LED	LED Gasket
14	1	LBL WSP KIT	Label Kit for Whisper 602
15	1	LBL CITY LA	Label for City of LA Approval
16	1	BOX WHISPER	Box for Whisper 602 System
17	1	KEYPADBFGRFX	Buffalo Filter Membrane Switch Graphics
18	1	MEMBRANEBLNK	Membrane Blank
19	8	BOLT10-32 .5	Bolt 10-32 0.5" SS
20	1	BOLT10-32.75	Bolt 10-32 0.75" Long
21	5	BOLT6-32 .5"	Bolt 6-32 0.5" Long -PAN HD
22	5	WASHER #6S	Star washer #6 electrical
23	2	WASHER 1/4"L	Lock Washer 1/4" split ring
24	4	WASHER #10F	Flat washer #10
25	2	NUT JAM10-32	Jam Nut 10-32, Zinc
26	26	NUT 10-32	10-32 Lock Nuts S/S
27	1	WALL PLATE	Wall Plate Suction Canister
28	4	WHEELS 2"	Whisper 602 Wheels
29	1	RUBBER FEET	Cylindrical Isolator
30	1	INSULKIT WSP	Insulation Kit for Whisper 602
31	8	ISOLATORS	Motor Isolators
32	1	MANUAL602/12	602/1202/Whisper/TURBO Operator's Manual
33	1	REF6EHT1	PN#6EHT1
34	1	LBL CE SMALL	CE Label Small

## PlumeSafe Whisper 602 100V / 50 & 60Hz

#	Quantity	Part Number	Description
1	1	HOUSING 602W	Whisper 602 Housing
2	1	MOTOR 120 DC	DC Brushless Motor
3	1	GSKT MM WSP	Gasket for Motor, SC-42 Closed Cell
4	1	HANDLEWHISPR	Handle For Whisper 602
5	1	HANDLE FOAM	Foam for Whisper 602 handle
6	1	CORD WRAP	Cord Wrap for Whisper 602
7	2	CIRCUIT 15	US – 15Amp Circuit Breaker
8	1	PWR EN MD.08	Power Entry Module (.080")
9	1	PCB-DB26 ASY	Whisper 602 PCB w/26" jack
10	1	CHP W6	Chip W6
11	1	PLUG/CORD602	Plug/Cord 12' AEC60, AEC250
12	1	WIRE ASSBLY	Wire Assembly for Whisper 602 – Complete w/E-Terms
13	2	GASKET LED	LED Gasket
14	1	LBL WHIS S/N	Label Kit for Whisper 602
15	1	LBL CITY LA	Label for City of LA Approval
16	1	BOX WHISPER	Box for Whisper 602 System
17	1	KEYPADBFGRFX	Buffalo Filter Membrane Switch Graphics
18	1	MEMBRANEBLNK	Membrane Blank
19	8	BOLT10-32 .5	Bolt 10-32 0.5" SS
20	1	BOLT10-32.75	Bolt 10-32 0.75" Long
21	5	BOLT6-32 .5"	Bolt 6-32 0.5" Long -PAN HD
22	5	WASHER #6S	Star washer #6 electrical
23	2	WASHER 1/4"L	Lock Washer 1/4" split ring
24	4	WASHER #10F	Flat washer #10
25	2	NUT JAM10-32	Jam Nut 10-32, Zinc
26	26	NUT 10-32	10-32 Lock Nuts S/S
27	1	WALL PLATE	Wall Plate Suction Canister
28	4	WHEELS 2"	Whisper 602 Wheels
29	1	RUBBER FEET	Cylindrical Isolator
30	1	INSULKIT WSP	Insulation Kit for Whisper 602
31	8	ISOLATORS	Motor Isolators
32	1	MANUAL602/12	602/1202/Whisper/TURBO Operator's Manual
33	1	REF10EHT1	PN#10EHT1

## Section M.

### Terms & Warranty

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SPECIFICATIONS. All product specifications are subject to change without notice.

SHIPMENT OF ORDER. Buffalo Filter will try to accommodate individual customer requests for shipping method. Buffalo Filter reserves the right to decide shipping method on prepaid orders. Care is exercised in the checking and packaging of all merchandise to avoid error, but should discrepancies arise, claims should be made within 24 hours after delivery.

All products are shipped F.O.B Buffalo Filter's facilities, and risk of loss transfers to the purchaser upon tender of delivery to the carrier at our dock. If the merchandise is damaged after risk of loss has transferred, a claim must be made to the carrier involved. Buffalo Filter will provide reasonable assistance to customers in pursuing these claims.

RETURN OF MATERIAL. In the event of an error by Buffalo Filter, products may be returned to Buffalo Filter for correction of such error. In all other cases, returns will only be accepted with the prior consent of Buffalo Filter, in its sole discretion, and will be accepted only in exchange for merchandise of an equivalent dollar value, less a reasonable restocking and handling charge.

In all cases, returns will not be accepted unless a pre-authorized return number is obtained from Buffalo Filter in advance. This number must be clearly marked on the exterior of the packaging before returning products to Buffalo Filter. All transportation costs must be prepaid by the shipper and all risks of loss and damage of goods are the responsibility of the shipper. Unauthorized returns will be refused. Include a copy of the packing papers and/or invoice with the return. Buffalo Filter shall have no obligation to refund the purchase price of any returned merchandise.

ENTIRE AGREEMENT. By acceptance of products from Buffalo Filter, Purchaser acknowledges and agrees to all of the terms and conditions contained herein. No additional or different terms or conditions shall apply unless expressly accepted by Buffalo Filter in writing in advance. All matters involving the validity, interpretation and application of this agreement shall be controlled by the laws of New York State without regard to conflicts of laws rules..

JURISDICTION. Purchaser hereby consents to the jurisdiction of the New York Courts with respect to any controversy or dispute arising out of this agreement or the merchandise sold hereunder.

LIMITED WARRANTY. Buffalo Filter will replace without charge, or at its option, refund the purchase price of, any goods which Buffalo Filter determines to have contained a defect in material or workmanship as of the date of shipment for a period of three (3) years from the date of delivery for P/N PSWTURBO and for a period of one (1) year from the date of delivery for all other goods, provided, however, that Buffalo Filter is promptly notified of any suspected defect and is given the opportunity to inspect the goods in question and the installation and use thereof. Using any filter not manufactured by Buffalo Filter may cause damage to the system which will not be covered by this warranty.

**THE FORGOING WARRANTY IS THE ONLY WARRANTY MADE BY BUFFALO FILTER AND IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. ALL WARRANTIES IMPLIED BY ANY COURSE OF DEALING OR USAGE BETWEEN THE PARTIES ARE EXPRESSLY EXCLUDED AND NO PROMISE OR AFFIRMATION OF FACT MADE BY ANY AGENT OR REPRESENTATIVE OF BUFFALO FILTER SHALL GIVE RISE TO ANY LIABILITY OR OBLIGATION.**

LIMITATION OF LIABILITY AND INDEMNIFICATION BY PURCHASER. **BUFFALO FILTER SHALL NOT BE LIABLE IN ANY CASE FOR SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND. IN NO CASE SHALL BUFFALO FILTER'S LIABILITY EXCEED THE AMOUNT PAID BUFFALO FILTER BY PURCHASER FOR THE SPECIFIC SYSTEM GIVING RISE TO THE LIABILITY. PURCHASER AGREES TO INDEMNIFY AND HOLD BUFFALO FILTER HARMLESS FROM AND AGAINST ALL LIABILITIES, CLAIMS, AND DEMANDS OF THIRD PARTIES OF ANY KIND RELATING TO THE USE OF PRODUCTS PURCHASED HEREUNDER.**

CONFIDENTIAL INFORMATION. Any information, drawings, plans, or specifications furnished by Buffalo Filter have been developed at Buffalo Filter's expense, are confidential and proprietary to Buffalo Filter. Recipients are granted a limited license to use such items to install, operate, and maintain the products with which they are supplied and are not permitted to disclose such items or to use them for any other purpose.